

Claims

1.-17. (cancelled)

18. (new) A network having redundancy properties, comprising:

- a redundancy manager;
- at least one branching unit for connecting a user device to the network; and
- a line having two line ends, the two line ends connected to the redundancy manager,

the redundancy manager configured to:

- disconnect the two line ends from each other in an error-free state of the line;

- connect the two line ends in an error state of the line; and

- feed a supply voltage into one of the two line ends for supplying a user device connected to the network via the branching unit, wherein

- the branching unit is arranged in the network line such that a first cable having a first cable end of the network line is connected to a first network connection of the branching unit and a second cable having a second cable end of the network line is connected to a second network connection of the branching unit,

- the branching unit is configured to:

- check a state of the first cable if the supply voltage is received at the second network connection and to check a state of the second cable if the supply voltage is received at the first network connection; and

- forward the supply voltage to the first respectively second cable only if the first respectively second cable has an error-free state, and

- the redundancy manager is configured to:

- feed a further supply voltage to the first line end if the supply voltage is fed to the second line end and is not detected at the first line end after lapse of a predetermined period of time by the redundancy manager; and

- feed the further supply voltage to the second line end if the supply voltage is fed to the first line end and is not detected at the second line end after lapse of the predetermined period of time by the redundancy manager.

19. (new) The network in accordance with claim 18, wherein the network is a PROFIBUS PA network.

20. (new) The network in accordance with claim 18, wherein the redundancy manager and the branching unit each include a termination element configured to be connected to the first or second line end if the redundancy manager or the branching unit are arranged at the first respectively second line end.

21. (new) The network in accordance with claim 18, wherein the branching unit comprises two switches and a control unit, the two switches configured to be actuated by the control unit such that a user device connected to the branching unit can be selectively connected to the first or to the second network connection or to both the first and second network connections for maintaining power supply to the user device and for maintaining data transmission from the user device to the network.

22. (new) The network in accordance with claim 21, wherein the branching unit comprises a resistor network including the two switches, and the switches are configured to be actuated by the control unit such that a current or a voltage related to the first or second cable connected to the first respectively second network connection can be checked by the control unit.

23. (new) The network in accordance with claim 18, wherein the branching unit comprises an energy accumulator configured to be charged by the supply voltage at least in the error-free state, and the branching unit is configured to measure a voltage present at the user device connected to the network via the branching unit and to connect the energy accumulator to the user device if the measured voltage corresponds to a voltage deficit.

24. (new) The network in accordance with claim 18, comprising a plurality of branching units, wherein the redundancy manager includes a recording unit for recording the timely behaviour of a voltage or a current related to the supply voltage at the first or second line end during forwarding of the supply voltage by any of the branching units and for determining the number of branching units fed by the supply voltage up to a physical error location.

25. (new) The network in accordance with claim 18, wherein the redundancy manager includes a further recording unit for recording changes of a voltage or a related to the supply voltage at the first or second line end and for determining a state transition of the network.

26. (new) A branching unit for connecting a user device to a network having redundancy properties, the network comprising a line having two line ends connected to a redundancy manager of the network, the redundancy manager configured to disconnect the two line ends from each other in an error-free state of the line and to connect the two line ends to each other in an error state of the line, the branching unit comprising first and second network connections for connecting first respectively second cable ends of the line to the branching unit, wherein the branching unit is configured to:

be arranged in the line by connecting the first and second cable ends to the first respectively second network connections;

check a state of a first cable connected to the first network connection via the first cable end if a supply voltage is received at the second network connection;

check a state of a second cable connected to the second network connection via the second cable end if the supply voltage is received at the first network connection; and

forward the supply voltage to the first respectively second cable only if the first respectively second cable has an error-free state.

27. (new) The Branching unit in accordance with claim 26, further comprising two switches and a control unit, the two switches configured to be actuated by the control unit such that a user device connected to the branching unit can be selectively connected to the first or to the second network connection or to both the first and second network connections for maintaining power supply to the user device and for maintaining data transmission from the user device to the network.

28. (new) The branching unit in accordance with claim 27, further comprising a resistor network including the two switches, wherein the switches are configured to be actuated by the control unit such that a current or a voltage related to the first or second cable connected to the first respectively second network connection can be checked by the control unit.

29. (new) The branching unit in accordance with claim 26, further comprising an energy accumulator configured to be charged by the supply voltage at least in the error-free state, wherein the branching unit is configured to measure a voltage present at the user device connected to the network via the branching unit and to connect the energy accumulator to the user device if the measured voltage corresponds to a voltage deficit.

30. (new) The branching unit in accordance with claim 26, wherein the first and second network connections are configured to be fixed in a predetermined electrical state for performing maintenance or repair work.

31. (new) A redundancy manager for a network having redundancy properties, the network having a line including first and second line ends, the first and second line ends connected to the redundancy manager, the redundancy manager configured to:

disconnect the first and second line ends from each other in an error-free state of the line;

connect the first and second line ends in an error state of the line;

feed a supply voltage into the first or second line end for supplying a user device connected to the network via a branching unit;

feed a further supply voltage to the first line end if the supply voltage is fed to the second line end and is not detected at the first line end after lapse of a predetermined period of time by the redundancy manager; and

feed the further supply voltage to the second line end if the supply voltage is fed to the first line end and is not detected at the second line end after lapse of the predetermined period of time by the redundancy manager.

32. (new) The redundancy manager in accordance with claim 31, further comprising a plurality of branching units and a recording unit for recording the timely behaviour of a voltage or a current related to the supply voltage at the first or second line end during forwarding of the supply voltage by any of the branching units and for determining the number of branching units fed by the supply voltage up to a physical error location.

33. (new) The redundancy manager in accordance with claim 31, further comprising a communication interface for connecting the redundancy manager to a higher-ranking network and for exchanging data with the higher-ranking network.

34. (new) The redundancy manager in accordance with claim 33, further comprising at least two segment couplers for connecting the redundancy manager to at least two communication channels of the higher-ranking network, the higher-ranking network embodied as a redundant network, wherein the redundancy manager is configured to:

- monitor a functionality of the at least two segment couplers; and
- select one of the segment couplers for connecting the redundancy manager to the network having redundancy properties.

35. (new) A method of operating a network having redundancy properties, the network comprising a line having first and second line ends connected to a redundancy manager, the method comprising:

- disconnecting the first and second line ends from each other in an error-free state of the line;

- connecting the first and second line ends in an error state of the line;

- feed a supply voltage into the first or second line end for supplying a user device connected to the network via a branching unit;

- feed a further supply voltage to the first line end if the supply voltage is fed to the second line end and is not detected at the first line end after lapse of a predetermined period of time by the redundancy manager; and

- feed the further supply voltage to the second line end if the supply voltage is fed to the first line end and is not detected at the second line end after lapse of the predetermined period of time by the redundancy manager.